
Space Weather Forecast

Issued on Monday, 06 May 2024 at 13:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Further moderate flares expected with a chance of isolated strong flares through the period. Geomagnetic activity expected to be unsettled to active with a chance of some G1-G2/Minor-Moderate storm intervals due to CME (coronal mass ejection) impacts and a slight chance of isolated G3 conditions. Confidence lower than usual due to limited imagery.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has reached High levels. A large and complex sunspot region in the northwest has produced numerous moderate flares and 2 strong flares in the last 24 hours, the largest and most recent a strong flare at 06/0635 UTC and a smaller strong flare at 05/1154 UTC. A further large region in the southeast also contributed two moderate flares. Further moderate flares are expected, predominately from either AR3663 or AR3664, with a chance of isolated X-flares

There are currently nine sunspot regions on the visible disc. Aside from the active spot groups mentioned, a much smaller and simpler sunspot group in the southeast showed some signs of growth. The remaining sunspots on the disc are generally small, stable or in slight decay, and magnetically simple.

A CME in association with strong flare at 06/0635 UTC may have an Earth directed component, however there is a significant and ongoing coronagraph imagery gap which is causing confidence to be lower than usual.

Solar Wind / Geomagnetic Activity: Solar winds were initially at background levels but became slightly enhanced after connection with a high speed stream after 060600UTC. The Interplanetary Magnetic Field was initially weak but showed a gradual increasing trend, becoming moderate after a suspected glancing blow from a CME (coronal mass ejection) at around 052330UTC. The important north-south component was initially weakly positive, then transitioned into a Moderate southward orientation during the evening, before rotating moderately positive after the CME arrival, then from around 060400UTC it varied with moderate strength. These parameters likely indicate some CME influence. Resultant Geomagnetic activity was initially predominantly Quiet (Kp 0-2), becoming Unsettled to Active (Kp 3-4) 05/1800-2359 UTC, with G1 Minor storm (Kp5) from 06/0000-0600, before returning to Quiet. Lerwick observatory recorded a G3/Strong Storm interval (Kp 7) just prior to midnight UTC, likely due to CME impacts.

Energetic Particles / Solar Radiation: Solar radiation was at normal background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast to continue with further Moderate-flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the northwest and southeast disc.

Solar Wind / Geomagnetic Activity: There are multiple Earth-directed CMEs (coronal mass ejections) currently in the forecast period. A CME associated with 03 May strong flare may

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interact with Earth Day 1, although this may have been the CME which arrived at 0018UTC earlier today. A CME associated with the 04 May Moderate flare may give a glancing blow late Day 1/early Day 2 (6th-7th May). A CME associated with the 06 May X4.5 flare may cause an impact late Day 2/early Day 3 (7th-8th May). Due to lack of imagery there is very low confidence regarding CME arrival times.

Earth is likely under the influence of a HSS (High speed stream) from CH35/+ or CH33/+ which is expected to continue through Day 1 and Day 2, before slowly decline through Day 3

Geomagnetic activity is expected to becoming Unsettled to Active through Day 1, with a chance of some G1- G2 (Kp5-Kp6)/Minor-Moderate storm intervals conditions due to CME impacts and a slight chance of isolated G3 (Kp 7)/strong storm intervals if CME impact is more significant. Activity should generally subside by 4 (09 May) to mostly Quiet conditions by the end of the period.

Energetic Particles / Solar Radiation: Solar radiation levels is most likely to remain at background levels through the period. There is a slight chance for an S1/Minor Storm or greater event occurring throughout however, primarily from the large, complex sunspot region in the northwest disc.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	50	60	70	20
Strong	G3	No	10	20	20	1
Severe	G4	No	1	1	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	90	90	90	90
Very Active	R3 to R5 X	Yes	40	40	40	40

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	30	30	30	30
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)